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## ABSTRACTS OF COMPLETED RESEARCH - 1968



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ABSTRACTS OF COMPLETED RESEARCH - 1968

These abstracts cover the research reported upon during 1968. Complete copies will be provided by mailing requests to the attention of the senior author.

RANSOM J. ARTHUR  
Captain, MC USN  
Officer in Charge

NAVY MEDICAL NEUROPSYCHIATRIC RESEARCH UNIT  
SAN DIEGO, CALIFORNIA 92152

ABSTRACTS OF COMPLETED RESEARCH - 1968

MR011.01-6001      Multivariate Analyses of Manifest Psychopathology and Urine  
Report No. 68-32      Biochemical Measures in Manic-Depressive Illness

Robert T. RUBIN and John E. OVERALL

**Abstract:**      Two hospitalized rapidly cycling manic-depressive patients underwent daily ratings by nursing staff using the Overall-Gorham Brief Psychiatric Rating Scale and daily 24-hour urine collections for assay of volume, osmolality, 17-hydroxycorticosteroids, vanillylmandelic acid, kynurenine, and indoleacetic acid.

Multivariate analyses of the BPRS and biochemical data. The BPRS yields useful day-to-day measures of changes in psychopathology in manic-depressive illness and delineates specific manic and depressive symptom clusters for each patient. Regression equations for the biochemical measures were constructed to yield a "predicted" contrast function correlating best with BPRS contrast function for each patient. Time-series plots were made with BPRS contrast function and biochemical "predicted" contrast function together, and with BPRS and biochemical discriminant combinations together. These time-series plots generally revealed that shifts in the biochemical domain lagged several days behind shifts in the BPRS domain. It appears that the urine biochemical variables were peripheral reflections of alterations in total body metabolic pathways secondary to both specific central nervous system influences, such as ACTH release, and non-specific changes, such as level of motor activity, occurring with shifts between mania and depression. It does not appear that the urine variables measured in this study reflected any biochemical CNS changes antecedent to shifts in manifest psychopathology during the manic-depressive cycle.

MR005.18-0011      Neurological Complications of Fibrous Dysplasia of the Skull  
Report No. 68-2

Jon F. SASSIN and Roger N. ROSENBERG

**Abstract:**      Fifty cases of fibrous dysplasia of the skull were reviewed clinically and neurological complications studied. Skull involvement is most frequently a monostotic form of the disease and may appear and progress in adults as well as children. Visual impairment secondary to optic nerve compression occurred in eight cases and conductive hearing loss in four. Seizures occurred in six patients. No other neurological deficits were encountered. Optic canal decompression in patients with visual deficits may be necessary to prevent further loss of vision. Close observation of patients with involvement of the base of the skull is important.

MR005.18-0011  
Report No. 68-8

Simple Manual Plotting of Contours as a Method of EEG Analysis

Paul NAITOH and Donald O. WALTER

Abstract: A simple manual method of plotting a flat contour map was described with a few worked-out examples. A contour mapping may serve many purposes, in data compression and in generating new insights.

MR005.18-0011  
Report No. 68-25

Spectral Analysis of the EEG of Dominant and Non-Dominant Alpha Subjects During Waking and Sleeping

Laverne C. JOHNSON, Ardie LUBIN, Paul NAITOH, Cyril NUTE and Marion T. AUSTIN

Abstract: EEG spectral analysis of the left parietal lead (P3) was carried out on nine high alpha and four low alpha subjects. A 0.2 hertz resolution interval was used on analysis periods of 1 minute.

The most prominent feature of the spectra was a delta peak at about 1 hertz consistently present for all subjects during waking as well as sleeping. The intensity of this delta peak increased monotonically from waking through sleep stages 1, 2, 3, and 4 with stage REM intensity being equal to stage 1 intensity.

All subjects had a sigma peak at about 13 hertz during sleep stage 2, and a majority had a similar peak in stages 3 and 4. The average spectra show a sigma peak in all sleep stages, but none during waking. There were no consistent theta or beta peaks during waking or any stage of sleep.

The high alpha group showed an alpha peak in waking at about 10 hertz which decreased to about 9 hertz during stage 1 and stage REM. During waking and all stages of sleep, they generally had a higher intensity and higher variability than the low alpha subjects for all frequencies of the spectrum. High alpha subjects had more frequency peaks during stages 1 and REM. The two groups have very similar spectra in sleep stages 2, 3, and 4.

The waking intensities of the delta, theta, and alpha frequency bands have significant positive correlations with their respective intensities during sleep. Waking intensity of the alpha band never correlated with delta intensity during waking or sleeping.

These results favor the hypothesis of constant frequency generators for delta and sigma with an increase in energy during sleep. But they also fit the hypothesis of an alpha generator which decreases in frequency and energy during sleep.

The single, best discriminator of waking and the sleep stages was delta. Alpha and sigma intensities add to the discrimination. However, stage 1 and REM have very similar spectral profiles for all subjects. For the low alpha subjects, waking, stage 1, and stage REM have spectra that are almost indistinguishable.

MF022.01.01-9001  
Report No. 68-13

Relative Predictability of Occupational Groups and Performance Criteria in an Extreme Environment

Robert E. DOLL, E. K. Eric GUNDERSON and David H. RYMAN

Abstract:

Recent developments in personnel assessment have emphasized the need to consider and integrate many kinds of information about an individual and to define as clearly as possible the specific criterion behaviors to be predicted. Previous research has demonstrated that the validity of predictors tends to vary over groups and situations. The present study is concerned with the predictability of three Antarctic occupational groups on five performance measures utilizing a variety of predictor sources. Specificity of predictors for the various groups and criteria are evaluated. This type of analysis may help identify conceptually meaningful predictors for varied work roles in an extreme environments.

MF022.01.02-9002  
Report No. 68-11

Fleet Effectiveness Prediction Studies at a Recruit Training Command

John A. PLAG and Jerry M. GOFFMAN

Abstract:

The validity of one aspect of the Navy's neuropsychiatric assessment program at recruit training commands was ascertained by purposely graduating from training 134 enlistees who were judged by naval aptitude boards to be unsuitable for service. The graduating group constituted two-thirds of all recruits adjudged unsuitable by aptitude boards during four sampling periods in 1960 and 1961. Two and a half years later, 97 of the graduating sailors were still on active duty and their performance, as measured by ratings obtained from line superiors, showed no demonstrably consistent difference from that of a group of matched suitable controls.

MF022.01.02-9002  
Report No. 68-14

Predicting the Military Effectiveness of Naval Enlistees Returned to Duty from the Psychiatric Sick-List.

John A. PLAG, Jerry M. GOFFMAN, and George R. BOWEN

Abstract:

A measure of four-year military effectiveness was obtained for a sample of 140 naval enlistees who had been admitted to the psychiatric sick-list during their first enlistments and subsequently returned to duty. Forty-four predictor variables

were derived from pre-service, early training, and illness data and correlated with the criterion.

Forty-three per cent of the return-to-duty patients rendered effective service. Eleven of the predictors were found to be significantly related to the criterion. Four of these-- education, months of active duty prior to hospitalization, number of siblings, and chronicity of illness--accounted for unique criterion variance, with a composite validity of .54.

MF022.01.02-9003  
Report No. 68-12

#### Changes in Self-Reported Symptomatology During Recruit Training

George A. CLUM, John A. PLAG, and Delbert KOLE

##### Abstract:

Scores on the Cornell Medical Index were found to be high at the beginning of the Marine recruit training, but declined steadily as training progressed. The use of a control group provided evidence that this decline in symptoms was not due to repeated testings, but more likely reflected an actual decrease in subjective distress. A correlational analysis of demographic variables and the extent of decrease in symptomatology, indicated that older, more intelligent recruits, who had attained a relatively high level of education and who had positive attitudes toward the Marine Corps, also were more consistent in the number of symptoms acknowledged.

MF022.01.03-9005  
Report No. 68-4

#### Psychiatric Problems in Polar Environments

E. K. Eric GUNDERSON

##### Abstract:

The combined effects of physical and social isolation, confinement, monotony, interpersonal differences, and reduced work, recreational and social activity, particularly during the winter months, probably account in large degree for the frequent mild to moderate psychological disturbances which typically manifest themselves in irritability, depression, insomnia, or withdrawal. As emphasized by Lantis, the physical environment is not so important for its direct effects upon behavior as for its indirect effects. Prediction of psychological adaptation in isolated groups has been only modestly successful; prediction must take into account environmental and occupational differences as well as personal background and personality differences. Systematic studies of the incidences and prevalences of mental disorders in polar regions and their environmental and social correlates have only begun.

MF022.01.04-9006  
Report No. 68-9

#### Serum Uric Acid and Cholesterol Variability: A Comprehensive View of Underwater Demolition Team Training

Richard H. RAHE, Robert T. RUBIN, and Ransom J. ARTHUR

##### Abstract:

One-third of a Navy underwater demolition team training class (32 men) was investigated by thrice weekly psychological

assessment and serum uric acid and cholesterol determinations until they either dropped from training or graduated. In general, significant elevations in serum uric acid occurred when trainees were eagerly taking on arduous activities with an optimistic attitude and determination to succeed. Significant elevations in serum cholesterol levels were seen in training situations in which the men felt overburdened by environmental variables, when they were relatively physically inactive, and for selected individuals, when they failed portions of the training course.

MF022.01.04-9006  
Report No. 68-10

#### Multiple Biochemical Correlates of Manic-Depressive Illness

Robert T. RUBIN

##### Abstract:

Several biochemical parameters were investigated in an attempt to elucidate changing patterns of physiologic activity with changes in mood in manic-depressive illness. Two hospitalized rapidly cycling manic-depressive patients underwent daily clinical ratings of mood, daily measurements of blood pressure and weight, and daily 24-hour urine collections for creatinine, 17-hydroxycorticosteroids (17-OHCS), vanillylmandelic acid (VMA), kynurenine, and indole-3-acetic acid (IAA). Mean daily excretion was calculated for each variable measured for each clinical phase. The following results were obtained and discussed: (1) Urine volume and creatinine excretion were lower during depression, most likely on the basis of reduced fluid intake. (2) VMA excretion was higher during mania and correlated with level of physical activity. (3) Kynurenine excretion was lower during depression, possibly on the basis of heightened metabolism of kynurenine during depression. (4) IAA excretion was increased during depression, although variations in daily levels during all phases were considerable. The multiple biochemical variables herein reported suggest both inter-subject and intra-subject differences in patterns of physiologic activity in patients with rapidly cycling mood disorders. The results highlight the difficulty inherent in inferring central mechanisms from the measurement of peripheral variables.

MF022.01.04-9006  
Report No. 68-15

#### Serum Uric Acid: Diurnal and Hebdomadal Variability in Normoactive Subjects

Robert T. RUBIN, John A. PLAG, Ransom J. ARTHUR, Richard H. RAHE, and Brian R. CLARK

##### Abstract:

Serum uric acid levels measured in normoactive subjects showed small but statistically significant diurnal and hebdomadal patterns. Blood samples were drawn from eight healthy Navy medical corpsmen three times daily for one week. Inter-subject differences in serum uric acid levels were significantly greater than time-of-day or day-to-day changes within individual subjects..

MF022.01.04-9006  
Report No. 68-16

A New Fluorimetric Method for the Determination of Cortisol  
in Serum

Brian R. CLARK and Robert T. RUBIN

**Abstract:** A simple, rapid serum cortisol method having the specificity and precision of lengthier chromatographic purification procedures is described. It uses a metaperiodate oxidation of cortisol and corticosterone to their corresponding 17 $\beta$ -carboxylic acid. Only the cortisol derivative is fluorescent. Forty samples may be processed in eight hours with minimal equipment and glassware. The method is easily adaptable to ultramicro techniques.

MF022.01.04-9006  
Report No. 68-17

17-Hydroxycorticosteroid and Vanillylmandelic Acid Excretion  
During 205 Hours of Sleep Deprivation in Man

Robert T. RUBIN, Edward J. KOLLAR, Grant C. SLATER, and  
Brian R. CLARK

**Abstract:** Previous studies of adrenal cortical activity during sleep deprivation revealed unchanged or lowered plasma 17-OHCS and either unchanged, lowered, or elevated urine 17-OHCS, depending on the subject and the length of the deprivation period. In the present study, plasma 17-OHCS and urine 17-OHCS and VMA were measured during 205 hours of wakefulness, the rationale being that an extended period might result in more definitive physiological responses. Plasma 17-OHCS in all four subjects decreased to a low point at about 90 hours, then increased to peak values at about 170 hours. Urine 17-OHCS tended to reflect changes in plasma 17-OHCS. Urine VMA varied considerable among the four subjects. The results suggest that prolonged sleep deprivation per se results in only mild, if any, specific activation of the pituitary-adrenal cortical axis and variable increased in catecholamine biosynthesis. Differing patterns of physiologic activity may occur among sleep-deprived subjects.

MF022.01.04-9006  
Report No. 68-21

Blood Pressure Measurement in the Study of Manic-Depressive  
Illness

Robert T. RUBIN and Michael W. BODIE

**Abstract:** As a part of an investigation of physiological and biochemical correlates of manic-depressive illness, two hospitalized rapidly cycling manic-depressive women underwent daily clinical ratings of mood and daily measurement of systolic and diastolic blood pressures. It was anticipated that significant alterations in blood pressure might occur during different phases of their cycles. The following results were obtained for both patients: (1) Mean systolic and diastolic pressures between cycle phases were not significantly different. (2) Analyses of variance and



intercorrelation of values by day of week indicated that measurement of blood pressure on combinations of weekdays adequately reflected overall values as determined by measurements made every day throughout hospitalization.

These findings suggest that blood pressure is a stable physiologic parameter in manic-depressives, and as such might be useful for reflecting drug effects when psychopharmacological studies are done on these patients. The findings also suggest that daily measurement of blood pressure in manic-depressives is not an absolute necessity. Determinations made on a combination of two or three weekdays would suffice for accurate basal values and would reduce the demands on nursing staff.

MF022.01.04-9008  
Report No. 68-1

#### Sleep Loss and Performance

Ardie LUBIN and Harold L. WILLIAMS

#### Abstract:

Acute sleep loss causes mental and motor lapses, between which a subject may perform effectively. Task duration interacts with sleep loss to potentiate lapses. For self-paced tasks speed will be impaired but accuracy may remain high. Work-paced tasks lead to errors of omission rather than errors of commission. Sleep loss also has measurable effects on memory, if items are presented during the sleep loss period.

MF022.01.04-9008  
Report No. 68-3

#### Sleep Loss and Its Effects on Performance

Paul NAITOH

#### Abstract:

Major effects of sleep loss are found in small but notable lapses of attention and of responding, and these effects have been demonstrated in a variety of experimental situations. Duration of the task to be performed is important, as is the required speed of response and its complexity. Many non-task features, such as age, motivation, physical condition, temperature, and noise may also affect the performance of sleep-deprived subjects. New measures of performance may elicit further effects--cognitive as well as motor--of sleep deprivation.

MF022.01.04-9008  
Report No. 68-5

#### A New Micro Method for Determination of Cholesterol in Serum

Brian R. CLARK, Robert T. RUBIN, and Ransom J. ARTHUR

#### Abstract:

A rapid serum cholesterol method having the accuracy of longer methods is described. Forty samples, run in duplicate, may be processed in under 3 hours. There is a 45% increase in sensitivity over other methods. Determination of total, esterified, and free cholesterol may be done. Interfering substances are removed without lengthy saponification or solvent extraction and evaporation.

The chromogen is stable for 2 hours after extraction. No unstable reagents are used. Optical density readings on a

corrosive acid with possible bubble formation are eliminated. Minimal equipment and glassware are required; a colorimeter may be used for routine determinations.

MF022.01.04-9008 17-Hydroxycorticosteroid and Vanillylmandelic Acid Excretion  
Report No. 68-6 in A Rapidly Cycling Manic-Depressive

Robert T. RUBIN, William M. YOUNG, and Brian R. CLARK

**Abstract:** Twenty-four-hour urine specimens were collected daily from a rapidly cycling manic-depressive patient throughout a 3-month hospitalization, and were analyzed for volume, osmolality, creatinine, 17-OHCS, and VMA. Mean 17-OHCS excretion was significantly greater during depression than during hypomania, but only in the latter half of hospitalization, after the patient had become acclimatized to the hospital. Mean VMA excretion was significantly increased only during the period of hypomania when the patient was physically active. The 17-OHCS data suggest that interaction between stressful environmental stimuli and intrapsychic ego-defense strength determines the adrenal-cortical activity level during any given phase of the manic-depressive cycle. The VMA data are in accord with previous studies of catecholamine excretion in cyclic affect disorders.

MF022.01.04-9008 Psychological and Physiological Changes Following Total Sleep  
Report No. 68-18 Deprivation

Laverne C. JOHNSON

**Abstract:** A review of the literature on effects of total sleep deprivation is presented. Cognitive and motor tasks of long duration, of low subject interest and without knowledge of results, are highly susceptible to the effects of sleep loss. While marked behavioral and personality changes may occur during prolonged sleep loss (after 150 hours), these changes are usually transient and disappear with sleep in subjects who were emotionally stable before onset of sleep loss. Sleep loss per se does not appear to always result in chronic psychotic behavior. Reports of chemical and physiological changes were inconsistent and no clear cut pattern of change has been found.

MF022.01.04-9008 Body Motility During Sleep and Its Relation to the K-Complex  
Report No. 68-19

Jon F. SASSIN and Laverne C. JOHNSON

**Abstract:** All-night polygraphic recordings were made on five normal subjects for two nights to study body motility quantitatively in relation to the sleep electroencephalogram. Body movements were significantly related temporally to preceding K-complexes during stage 2 sleep with a mean latency of 2.52 seconds for 396 movements scored. This relationship was consistent for

both nights one and two. The rate of body movements per minute was significantly lower in slow wave sleep than in any other stage and was not different in stages 2 and REM. Movements in slow wave sleep were more extensive and usually occurred at the end of periods, often heralding a change of stage. Brief isolated twitches of extremities were predominantly observed in stage REM. In all stages, movements of the face and mouth alone were frequent. An attempt was made to unify the known relations of K-complexes, body movements and autonomic activity and to organize them with respect to subcortical origins and electrophysiologic mechanisms.

MF022.01.04-9008  
Report No. 68-20

#### Electroencephalographic Activity After Prolonged Sleep Loss

Paul NAITOH, Anthony KALES, Edward J. KOLLAR, James C. SMITH, and Allen JACOBSON

#### Abstract:

The major effect of prolonged sleep loss on the EEG is alpha reduction and this is accompanied by deterioration of subjective ratings of feeling tone, by low 17-OHCS, by degradation of tracking performance, and by reports of hypnagogic illusions. Observed low voltage EEG after sleep loss of 100 hours or more seems equivalent to sleep stage 1, or drowsy EEG pattern. After two nights of recovery sleep (12 and 8 hours), return to pre-deprivation levels of functioning is virtually complete.

MF12.524.001-9002  
Report No. 68-29

#### The Epidemiology of Illness in Naval Environments: Introduction

Ransom J. ARTHUR, Richard H. RAHE, and E. K. Eric GUNDERSON

#### Abstract:

The methodology and rationale for a series of field studies designed to reveal incidence rates of disease or injury among Navy men are described. Subjects were 2,684 Navy enlisted men stationed aboard three cruisers: two of the ships were deployed to Vietnam for combat operations while the third participated in NATO exercises in the Mediterranean. Questionnaires reflecting personal history, military status, and symptom data and recent changes in life adjustment were administered at the beginning of overseas deployment; sick call records were examined and illnesses recorded for the six to eight months of overseas operations. Analysis of relationships between environment and social background factors and illness incidence are detailed in subsequent reports.

MF12.524.001-9002      Epidemiology of Illness in Naval Environments: Temporal  
Report No. 68-30      Distribution, Severity, Prior Life Stress, and Combat Stress

Richard H. RAHE, Jack L. MAHAN, Jr., Ransom J. ARTHUR,  
and E. K. Eric GUNDERSON

**Abstract:** Navy enlisted men aboard three heavy cruisers (N = 2,684) were followed over a six to eight months overseas cruise period, and all dispensary visits were recorded in terms of their number, type, and severity. One-third of the crew had no dispensary visits during the cruise, one-quarter experienced a single illness episode, and the remainder had multiple illnesses during their time at sea and in-port. The majority of illnesses experienced were minor in severity. Respiratory, gastro-intestinal, genito-urinary, dermal, and muscular-skeletal disorders accounted for four-fifths of all recorded illnesses. Weekly illness incidence was correlated for each ship with the ship's operational schedule. Illness peaks were seen to coincide with changes in the ships' operations where the men encountered substantial work loads and sometimes felt some apprehension regarding their safety. When the 30% of each crew with the highest amount of pre-cruise life change was compared in terms of their illnesses during overseas deployment to the 30% of the crew with the lowest reported recent life changes, the former group reported almost one-third more illnesses overall. This difference in incidence was found to persist whether the illnesses were of infectious, metabolic, or traumatic origin.

MF12.524.001-9002      The Epidemiology of Illness in Naval Environments: Demo-  
Report No. 68-31      graphic, Social Background, and Occupational Factors

E. K. Eric GUNDERSON, Richard H. RAHE, and Ransom J.  
ARTHUR

**Abstract:** Relationships between demographic, social and family background, occupational and military status, and job satisfaction variables and amount of illness (number of sick calls) were examined in the naval population. Subjects were 2,684 Navy enlisted men aboard three cruisers deployed overseas. Amount of illness was negatively related to age, naval experience, and pay grade. Illness rates also varied with racial or ethnic group and educational level. Illness incidence was associated with occupational specialty, division assignment, and job satisfaction. The results demonstrated that a number of current life status factors have an important influence upon illness incidence in the naval environment.

MF12.524.001-9002  
Report No 68-33

Life Stress and Illness in the Naval Service

E. K. Eric GUNDERSON, Richard H. RAHE, and Ransom  
J. ARTHUR

Abstract:

Relationships between eight types of variables and illness incidence are examined in the context of Navy duty aboard ship: (1) operational activities of the ship, (2) demographic and social background information, (3) current life status factors, (4) occupational specialty and job assignment, (5) job satisfaction, (6) recent health history, (7) recent life crises or adjustment problems, and (8) self perceptions of health. The relative importance of these areas of information for assaying risk of illness is evaluated. Subjects were 2,684 enlisted men aboard three cruisers deployed overseas. All dispensary visits were recorded over a six to eight month period and related to the types of information indicated above. Overall illness rates were highest during periods of combat stress. Illness incidence varied with a number of demographic and background characteristics which reflect significant aspects of present life status -- pay grade, racial or ethnic group, type of duty assignment, and job satisfaction. A symptom index and recent health history were the most significant predictors of future illness.

MF12.524.002-9002  
Report No. 68-23

The Adaptation of Naval Enlistees Scoring in Mental Group IV on the Armed Forces Qualification Test

John A. PLAG

Abstract:

This study was designed to evaluate differences in the adaptations of "average" and mentally marginal sailors during four years of military service. Sailors with AFQT scores of 50 are significantly superior to category IV enlistees on military performance measures in which cognitive abilities play an essential role. While mental group IV sailors have appreciably lower rates of overall naval effectiveness, they do not differ significantly from average enlistees with respect to disciplinary and illness rates.

Four pre-enlistment characteristics were found to be valid for predicting four-year naval effectiveness among category IV personnel. These four variables were years of schooling completed, number of school expulsions, AFQT score, and number of arrests. An actuarial table, showing the probability of naval effectiveness as a function of different combinations of these four predictors, was constructed as a guide for the use of recruiting officers in making decisions concerning the enlistment of mentally marginal applicants.

MF12.524.002-9002 The Reliability of Diagnostic Decisions: A Review and Some  
Report No. 68-24 Distinctions

George A. CLUM

**Abstract:** Studies dealing with the reliability of the psychiatric nomenclature frequently do not permit assessment of the source of error. Unreliability may be attributable to poorly defined diagnostic categories, interjudge differences in interviewing techniques, or a lack of intrajudge consistency. The results of several studies designed to assess specific areas of the reliability controversy suggest that the psychiatric nomenclature may not be as bad as supposed, that judges are generally consistent within themselves, and that systematic differences between judges are the most likely source of unreliability. It is likely that closing the discrepancy gap between judges awaits the establishment of diagnosis as a basis for therapy.

MF12.524.002-900 Strategies for Predicting Adjustment of AFQT Category IV  
Report No. 68-28 Navy and Marine Corps Personnel

John A. PLAG, Walter L. WILKINS, and James D. PHELAN

**Abstract:** Four major points summarize the findings of our studies for Category IV Marines and sailors.

First, AFQT score is a valid predictor of an enlistee's performance and adjustment in military service. Category IV enlistees are inferior to average enlistees on a variety of measures of military adaptation.

Second, many Category IV enlistees are able to render effective military service. On the basis of our sampling of higher level Category IV personnel who entered the service in 1960 and 1961, 73% of Marines were found to be effective performers, while 65% of sailors rendered effective service.

Third, civilian educational achievement was found not only to be uniquely related to four-year military effectiveness for both of the services, but to be the most important, by far, of all the biographical predictors studied.

And fourth, it was hypothesized that differences in effectiveness rates for Category IV enlistees who entered the Navy and Marine Corps in 1960 and 1961 were more a function of differing personnel and administrative policies than a function of differences in the calibre of enlistee input.

MF12.524.002-9003 Attitude Change in Marine Recruit Training  
Report No. 68-26

George A. CLUM, Delbert KOLE, and Anne HOIBERG

**Abstract:** Attitudes toward the military and toward superior officers were found to change in a negative direction during recruit training. Multiple regression analysis of biographical

variables to a criterion of attitude change revealed that the recruit whose attitude changed in a positive direction can be characterized as young, of below-average intelligence, and from a lower socioeconomic background. Platoon variations on the criterion of attitude changed existed independently of variations in platoon composition. An analysis which compared the use of change scores as opposed to the use of final attitude score corrected for initial attitude level indicated that the methods were relatively comparable.

MF12.524.004-9008  
Report No. 68-27

Discrimination Among States of Consciousness Using EEG Spectra

Ardie LUBIN, Laverne C. JOHNSON, and Marion T. AUSTIN

Abstract:

EEG recordings were made during waking (W) and the five sleep stages (REM, 1, 2, 3, and 4) on thirteen young adult males. For each stage, one-minute sections of the parietal EEG trace were digitized and subjected to Fourier analysis. The resulting spectral intensities were divided into five frequency bands: delta, theta, alpha, sigma, and beta.

Linear discriminators for all six stages were calculated using stepwise multiple regression. The overall percent agreement with visual scoring was very poor ranging from zero for stage 3 to 91% for stage 4. Linear discrimination between pairs of stages yielded slightly better results, but stages 1 and REM were indistinguishable.

Delta is the best overall discriminator, increasing significantly through stages W, 1, 2, 3, and 4. Sigma is unique to sleep and is highest for stage 2. Theta is unimportant and beta plays no role at all.

Spectral analysis of the parietal EEG lead is not sufficient to differentiate among the six states of consciousness studied here. The use of detectors for such phasic events as eye movement and K-complexes might aid sleep stage discrimination considerably.

M4305.09-3001  
Report No. 68-7

# The Effects of Combat Duty on Ratings by Superior Officers

George A. CLUM

## Abstract:

A contingent of Marines, some of whom had been under fire, were compared with Marines who had been observed under fire by their superior officers and with Marines who had been under fire but not observed, on three criteria of effectiveness. Marines observed under fire received mean superior officer ratings of 5.383, compared to 4.880 for Marines not observed under fire and 4.687 for Marines not under fire. When these three groups of Marines were compared on average proficiency and conduct marks, received over their entire enlistment period, no differences obtained. Marines who were classifiable as administrative nuisances, but who were observed under fire had mean superior officer ratings of 4.969, while administrative nuisances who were not observed under fire or not under fire had ratings of 4.210 and 3.562 respectively. These results indicate that knowledge that a man has been in combat will result in his receiving a higher superior officer rating than if he had not been in combat, while actually observing him in combat will result in still higher valuations. Even men who have been administrative nuisances prior to combat experience are rated highly when observed in combat.

M4306.01-9003  
Report No. 68-22

# Psychophysiological Requirements of Man-in-the Sea

Paul NAITOH, Richard TOWNSEND, and Michael GREENWOOD

## Abstract:

One of the most important of the psychophysiological requirements for functioning effectively in an underwater environment is that for sleep. Sleep loss is harmful to man and in extreme situations may provoke psychosis, but the much more likely results of sleep deprivation in undersea living will be found in the cumulative effects of small performance decrements, lapses in efficiency and alertness, slight personality changes, and a decline in physical reserve possibly needed in emergencies.

Sleep research is reviewed to indicate the basic needs and to suggest areas of needed biomedical engineering research and development. Such research may facilitate the development of a sleep debt indicator, a drug to oppose effects of sleep loss, and a human-factored sleeping quarter.



## PARTICIPATION IN RESEARCH CONFERENCES AND SCIENTIFIC SOCIETIES

DURING CALENDAR YEAR 1968

The Scientific Director presented a two-day seminar at Amersfoort, Netherlands, on the social psychology of the selection process during a NATO meeting on selection. He was assisted by Dr. John Plag.

Staff members participated in and presented research reports at numerous research conferences and symposia during the year. These included naval and state hospitals; medical schools (University of Pennsylvania, University of Texas, Albert Einstein College of Medicine, St. Louis University, University of California at Los Angeles, University of California at San Diego); National Institute of Mental Health; Naval Research Reserve Seminar; Naval Base, Toulon; UCLA Symposium on Physiology and Pathology of Sleep; San Diego Bio-Medical Engineering Symposium; Reiss-Davis Clinic; Institute of Electrical and Electronic Engineers.

Papers were read at annual conventions of the American Psychiatric Association, the American Psychological Association, the American Psychosomatic Society, the Society for Psychophysiological Research, the Western Psychological Association, the Western Society for Pediatric Research, the California State Psychological Association, the International Congress for Applied Psychology, the Western Electroencephalographic Society, the California Association for Education of Young Children, the International Congress on Alcohol and Alcoholism.

The Officer in Charge is President of the San Diego Chapter of the Southern California Psychiatric Society. Dr. Laverne C. Johnson took office as President of the Society for Psychophysiological Research.